

PROPOSED NEW CLAIMS

I CLAIM:

17. A radio frequency (RF) receiver circuit, comprising:
 - a) an antenna for receiving an RF signal;
 - b) an optical detector for receiving and converting a modulated optical signal to an electrical signal;
 - c) means for mixing the electrical and RF signals at an intermediate frequency to produce an intermediate frequency signal; and
 - d) a reflective optical modulator operable at the intermediate frequency for modifying and reflecting the optical signal with the intermediate frequency signal.
18. The RF receiver circuit according to claim 17, wherein the means for mixing comprises a non-linear RF component.
19. The RF receiver circuit according to claim 18, wherein the non-linear RF component comprises a transistor.
20. The RF receiver circuit according to claim 17, wherein the optical detector comprises a photodiode.
21. The RF receiver circuit according to claim 20, wherein the photodiode comprises a non-linear RF component.
22. The RF receiver circuit according to claim 17, wherein the reflective optical modulator comprises a piezoelectric acoustic resonator.

23. The RF receiver circuit according to claim 17; and further comprising means for directing a part of the modulated optical signal onto the optical detector and a part onto the reflective optical modulator.

24. The RF receiver circuit according to claim 17, wherein the optical detector is located on a reflective surface of the reflective optical modulator such that the optical signal is simultaneously incident on both the reflective optical modulator and the optical detector.

25. The RF receiver circuit according to claim 17, wherein the antenna is operable to transmit the RF signal at an RF frequency related to a modulation frequency of the optical signal.

26. The RF receiver circuit according to claim 25, wherein the circuit is a transceiver capable of simultaneously transmitting and receiving RF signals.

27. The RF receiver circuit according to claim 17; and further comprising a photodiode having a capacitance and being connected to the antenna such that a resonant frequency of the antenna is remotely tuned by using the modulated optical signal to set the capacitance of the photodiode.

28. The RF receiver circuit according to claim 27, wherein the photodiode comprises the optical detector.

29. An interrogator circuit for use in a tagging system, comprising: semi-passive transponders and a radio frequency (RF) receiver circuit, comprising:

- a) an antenna for receiving an RF signal;
- b) an optical detector for receiving and converting a modulated optical signal to an electrical signal;

c) means for mixing the electrical and RF signals at an intermediate frequency to produce an intermediate frequency signal; and

d) a reflective optical modulator operable at the intermediate frequency for modifying and reflecting the optical signal with the intermediate frequency signal.

30. A radio receiver array, comprising: a plurality of radio frequency (RF) receiver circuits, each comprising:

a) an antenna for receiving an RF signal;

b) an optical detector for receiving and converting a modulated optical signal to an electrical signal;

c) means for mixing the electrical and RF signals at an intermediate frequency to produce an intermediate frequency signal; and

d) a reflective optical modulator operable at the intermediate frequency for modifying and reflecting the optical signal with the intermediate frequency signal.

31. A distributed antenna system, comprising: an optical fiber including a plurality of radio frequency (RF) circuits associated with the optical fiber, each RF circuit comprising:

a) an antenna for receiving an RF signal;

b) an optical detector for receiving and converting a modulated optical signal to an electrical signal;

c) means for mixing the electrical and RF signals at an intermediate frequency to produce an intermediate frequency signal; and

d) a reflective optical modulator operable at the intermediate frequency for modifying and reflecting the optical signal with the intermediate frequency signal.

32. A radio frequency circuit, comprising:

- a) an antenna; and
- b) a photodiode connected across the antenna, the photodiode having a capacitance and being operable for receiving a modulated optical signal to provide a local oscillator frequency of the circuit, the capacitance of the photodiode being used to tune the antenna.

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